

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT  
(PCT Article 36 and Rule 70)

REC'D 31 MAR 2005

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Applicant's or agent's file reference LU6144/Doe	<b>FOR FURTHER ACTION</b> See Notification of Transmittal of International Preliminary Examination Report (Form PCT/PEA/416)	
International application No. PCT/EP 03/13748	International filing date (day/month/year) 05.12.2003	Priority date (day/month/year) 20.12.2002
International Patent Classification (IPC) or both national classification and IPC B01J31/22		
Applicant BASELL POLYOLEFINE GMBH et al.		

- This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.
- This REPORT consists of a total of 5 sheets, including this cover sheet.
  - ☒ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of 1 sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the opinion
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☐ Certain defects in the international application
- VIII ☐ Certain observations on the international application

Date of submission of the demand  13.07.2004	Date of completion of this report  30.03.2005
Name and mailing address of the international preliminary examining authority:   European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized Officer  Bork, A-M  Telephone No. +49 89 2399-8311 

**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT**

International application No. **PCT/EP 03/13748**

**I. Basis of the report**

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):

**Description, Pages**

1-56 as originally filed

**Claims, Numbers**

1-11, 12 (part), 13 as originally filed  
12 (part) received on 25.11.2004 with letter of 24.11.2004

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).  
☐ the language of publication of the international application (under Rule 48.3(b)).  
☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.  
☐ filed together with the international application in computer readable form.  
☐ furnished subsequently to this Authority in written form.  
☐ furnished subsequently to this Authority in computer readable form.  
☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.  
☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:  
☐ the claims, Nos.:  
☐ the drawings, sheets:

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)).

*(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)*

6. Additional observations, if necessary:

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**V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability;  
citations and explanations supporting such statement**

**1. Statement**

Novelty (N)	Yes: Claims	1-13
	No: Claims	
Inventive step (IS)	Yes: Claims	
	No: Claims	1-13
Industrial applicability (IA)	Yes: Claims	1-13
	No: Claims	

**2. Citations and explanations**

**see separate sheet**

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**Re Item V**

Reference is made to the following document:

D1: WO-A-01 92346

**Novelty**

D1 discloses catalyst precursors for use in olefin polymerization reaction. The monocyclopentadienyl complexes of D1 (see examples 1-7) have a six-membered heteroaromatic ring bound to the cyclopentadienyl ring through a bridge. The complexes of the present application are different from the complexes of D1 in that the heteroaromatic ring bound to the cyclopentadienyl ring is a five-membered ring.

In view of the disclosure of D1 the subject-matter of claims 1-13 can be regarded as novel and meet the requirements of Art. 33(1) and (2) PCT.

**Inventive step**

D1 is to be considered as the closest prior art and in view of its contents the technical problem to be solved by the present application may be regarded as providing alternative monocyclopentadienyl complexes for use as catalysts for olefin polymerization.

The solution of this technical problem provided by the present application are the claimed monocyclopentadienyl complexes as characterised by present claims 1-7 with said distinguishing feature (a five-membered heteroaromatic ring bound to the cyclopentadienyl ring).

Claims 1-7 are not supported by the description as required by Article 6 PCT, as their scope is broader than justified by the description and by the examples. The reasons therefor are the following:

Based on the world wide accepted postulate that the catalytic properties of a compound are considered to be unexpected by the skilled person, the generalisation of examples in this specific field is high speculative.

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The examples of the application showing the catalytic activity of some of the complexes according to the application, namely for complexes in which Cp= indenyl, Z=CH<sub>2</sub>, A= substituted imidazolyl and M=Cr, cannot justify the broad definition of catalyst complexes of claims 1-7.

Therefore, the whole scope of claims 1-13 is to be seen as speculative and no inventive step can be recognised to catalytic complexes for which there is no proven effect (Article 33(3) PCT).

An inventive step for the catalysts complexes which are not supported by way of examples could be recognised only after the submission of further technical evidence (by way of examples) that the claimed compositions individually solve a technical problem or provide a technical effect,

The subject-matter of claims 1-13 do not meet the requirements of Article 6 and Article 33(3) PCT.

Taking into account the comparative example showing the better rate of comonomer incorporation using the catalysts of examples 1 and 2, with A an imidazole group, vs. a catalyst with A a pyridine group, the specific compounds of examples 1 and 2 meet the requirements of Article 33(3) PCT.

vicinal radicals  $R^{1A}$ - $R^{4A}$  may also be joined to form a five- or six-membered ring, and/or two vicinal radicals  $R^{1A}$ - $R^{4A}$  are joined to form a heterocycle which contains at least one atom from the group consisting of N, P, O and S,

5  $R^{6A}$  are each, independently of one another, hydrogen,  $C_1$ - $C_{20}$ -alkyl,  $C_2$ - $C_{20}$ -alkenyl,  $C_6$ - $C_{20}$ -aryl, alkylaryl having from 1 to 10 carbon atoms in the alkyl part and 6-20 carbon atoms in the aryl part and two geminal radicals  $R^{6A}$  may also be joined to form a five- or six-membered ring,

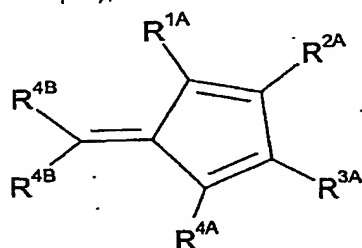
10 A is an unsubstituted, substituted or fused, heteroaromatic 5-membered ring system,

15  $R^{4B}$  are each, independently of one another, hydrogen,  $C_1$ - $C_{20}$ -alkyl,  $C_2$ - $C_{20}$ -alkenyl,  $C_6$ - $C_{20}$ -aryl, alkylaryl having from 1 to 10 carbon atoms in the alkyl part and 6-20 carbon atoms in the aryl part or  $SiR^{3B}_3$ , where the organic radicals  $R^{4B}$  may also be substituted by halogens and two geminal or vicinal radicals  $R^{4B}$  may also be joined to form a five- or six-membered ring and

20  $R^{3B}$  are each, independently of one another, hydrogen,  $C_1$ - $C_{20}$ -alkyl,  $C_2$ - $C_{20}$ -alkenyl,  $C_6$ - $C_{20}$ -aryl or alkylaryl having from 1 to 10 carbon atoms in the alkyl part and 6-20 carbon atoms in the aryl part and two radicals  $R^{3B}$  may also be joined to form a five- or six-membered ring,

which comprises the step a) or a'), where,

in step a), an  $A^-$  anion is reacted with a fulvene of the formula (VIIIa)



(VIIIa)

or,

in step a'), an organometallic compound  $R^{4B}M^BX^B$ , where

$M^B$  is a metal of group 1 or 2 of the Periodic Table of the Elements,

35  $X^B$  is halogen,  $C_1$ - $C_{10}$ -alkyl, alkoxy having from 1 to 20 carbon atoms in the alkyl part and/or from 6 to 20 carbon atoms in the aryl part, or  $R^{4B}$  and

b is 0 when  $M^B$  is a metal of group 1 of the Periodic Table of the Elements and is 1 when  $M^B$  is a metal of group 2 of the Periodic Table of the Elements,